



ISSN:2229-6107



**INTERNATIONAL JOURNAL OF
PURE AND APPLIED SCIENCE & TECHNOLOGY**

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SMART SOLDIER JACKET USING INTERNET OF THINGS (IOT)

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ABSTRACT: The Indian army is the land-based branch and it is the largest component of Indian Army. It will be beneficial for our country's safety if we try to provide them better advanced technology equipment. In this paper we have explained how to track the location of the soldier with the help of GPS and also we will be able to monitor health parameters such as heartbeat, pulse rate and body temperature. The measured parameters will be sent to the control room with the help of Wi-Fi module or GSM module to know the condition of the soldier. If the soldier is injured the fluctuations with the heartbeat and the pulse rate will be measured and will inform the military base station through Wi-Fi module and from GPS we can locate the wounded soldiers. From this information we can strategize the future war plan with the actual number of unharmed soldiers and also we can provide the needed medication for the harmed one with the location provided by the GPS. The proposed system will be consisting of wearable physiological equipment's, sensors and transmission modules which are mounted inside the jacket for communication between soldier and base station or between soldier and soldier. Hence, it is possible to implement a low cost mechanism to protect the valuable human life on the battlefield.

INTRODUCTION

In current world situations, defending our nation from external and internal threats is the most important factor and depends on the army force. Every year many army personnel suffer from different injuries during the battle and no help can be provided at the needed time. The army suffers a lot due to the unavailability of information of injuries to its personnel which may increase the death/ permanent disability toll. With the help of many advanced technologies coming into implementation, we can provide safety to the army personnel. It is necessary to develop a system in order to get the location and vital health status of the soldiers which can be tracked in real time. Soldier's location can be tracked using

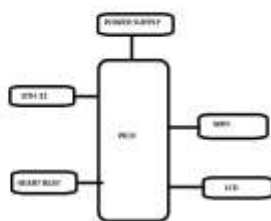
GPS and Wi-Fi module, which is used to provide wireless communication system between soldier and base station. Health status of the soldier is monitored using bio medical sensors such as temperature sensor and heart beat sensor. We are using technology of Internet of Things for the proposed system. IoT is simply the network of interconnected things/devices, which is embedded with sensors, software, network connectivity and necessary electronics that enables them to collect and exchange data making them responsive. Using IoT, the status of the soldier can be transferred from one place to another over the network. The IoT makes the entire monitoring process efficient, fast and the decisions can be taken in very less time.

Using GPS, the position and orientation of soldier is obtained. This system enables GPS Tracking of soldier's message which contains temperature, latitude and longitude as well as pulse rate of soldier. Here we are using ARM LPC2148 which allows dynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly. Here we are using LCD Display for displaying the values of present and maximum voltage values which are present in the rechargeable battery. The aim of the paper is to provide medical monitoring for soldier in real time. In other few projects, keypads are used to input some data by soldier which are not so useful and will make the system bulky in size. To overcome this part, we will use a panic button by which a soldier can request for medication from army base station within the wireless transmission and reception range.

PROBLEM DEFINITION Problems faced by army force are:

- The army base will not know about the location of soldier and cannot communicate with the soldier.
- The army base won't be able to send help when the soldiers are injured. These problems can be solved by:
- Continuous health monitoring of the soldier's health parameters.
- Location status of the soldier.
- Establishment of communication during emergency between control room and soldier.
- Alerts an emergency message through panic button

METHODOLOGY The system consists of three main parts: 1) Soldier Unit 1 2) Soldier Unit 2 3) Base Unit



Heart Beat Sensor Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. This digital output will be interfaced with LPC2148 microcontroller directly to measure the heartbeats in Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The comparator IC LM358 is used in Heart Beat Sensor prototype. Out of which, one will act as an amplifiers and another will be used as comparator for the output of light detector. When the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached to the detector. With each heart pulse, the detector signal varies. This variation is converted to electrical pulse.

ESP8266

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems[1] in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, the chip, and the software on it, as well as to translate the Chinese documentation.[3] The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi.[4] The successors to these microcontroller chips is the ESP32 family of chips, including the pin-compatible ESP32-C3.

CONCLUSION

The paper reports an IoT based system for the health monitoring and tracking of the soldiers. Arduino board is used which is a low cost solution for the possessing purpose. Biomedical sensors provides heartbeat, body temperature, and environmental parameters of every soldier to control room. This technology can be helpful to provide the accurate location of missing soldier in critical condition and overcome the drawback of soldiers missing in action. The addressing system is also helpful to improve the communication between soldier to soldier in emergency situation and provide proper navigation to control room. Thus we can conclude that this system will act as a lifeguard to the army personnel of all over the globe. In future, a portable handheld sensor device with more sensing options may be developed to aid the soldiers

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